Service Manual

S6 Power GSM

(S6 Classic GSM)

V 1.2

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2 Technical Data S6 (D) Power GSM

Length 159 mm

Width 55 mm

Thickness 16/22 mm

Volume 155 cm^3

Weight 180 gm (incl. battery)

Performance: GSM class 4 (2 Watt)

Frequency Range: Tx 890-915 MHz
Rx 935-960 MHz

Powersupply: Metal Hydride battery (3,6V/700mAh)

Standby time: up to 60 hours

Talk time: Up to 4 hours.

Carging Time: Full charge in 75 minutes

Display LCD high-resolution graphic display, 97 x 33 pixels, 4 rows of 16 characters

SIM Card Type: Small (plug in) 3V or 5V

3 General Information

The S6 Power is a consumer handset technically based on E10. It is also available as a dualrate version (S6 D Power).

4 Mechanical Concept

Note: All part numbers refer to mechanical drawing in section 4.1!

The S6 Power consists of two boards, the RF & Control module (1010) and the user interface (1020).

The connection between those two boards is not made by a normal connector with plug-in contacts, but by a special interconnector (1090) embedded into a shielding frame (1060). This interconnector is upholding the connection through the pressure implied on it by the housing.
Be careful when assembling the interconnector. Avoid any kind of dust or dirt because it will affect the contacts of the interconnector.

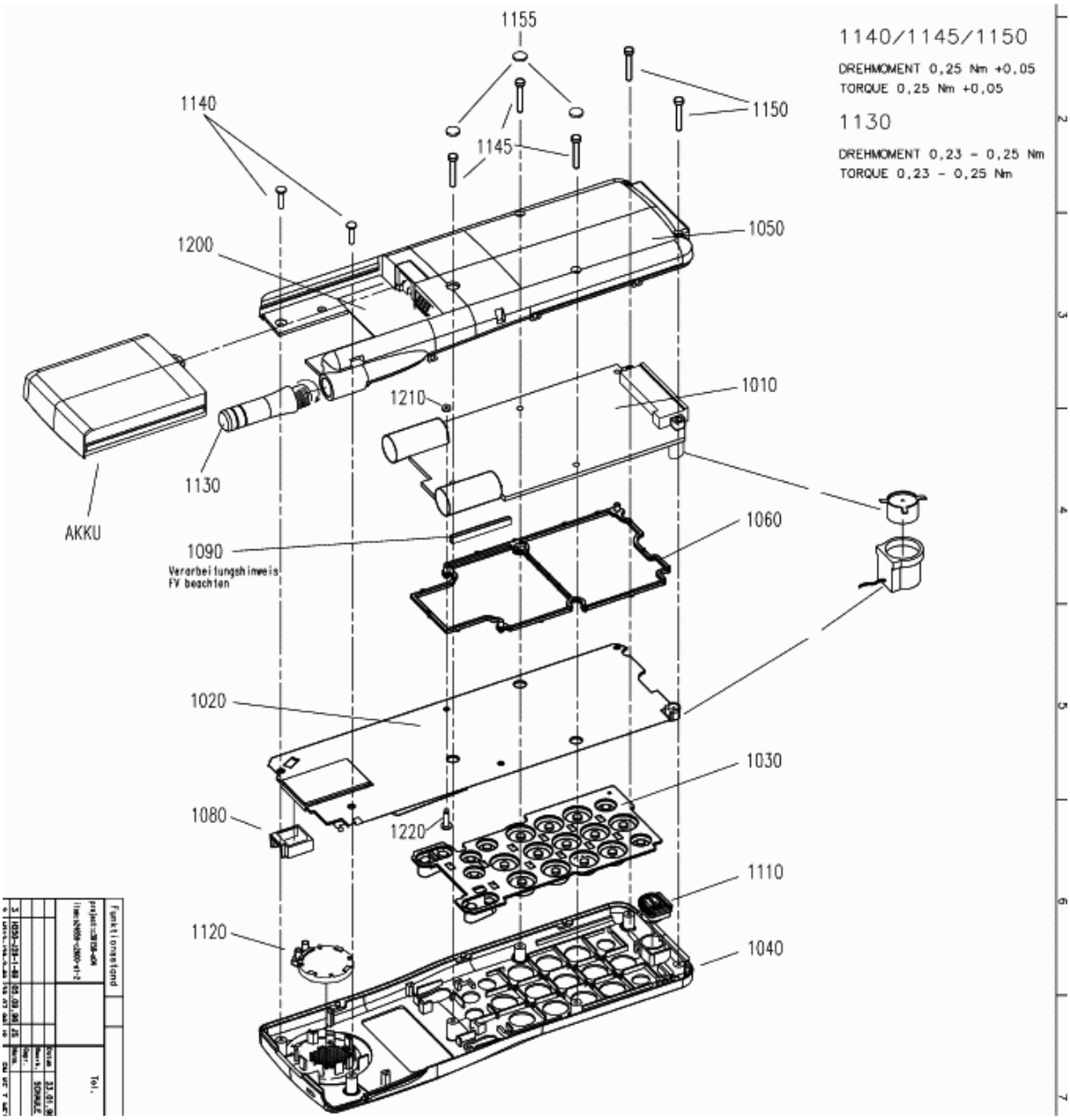
The only removable part on the user interface is the ringer gasket (1080) which is needed to increase the ringer volume.
Furthermore there is a RF-plug on the user interface which has to be plugged into the appropriate connector on the RF & control module. This conection is very essential because it is the RF signal from / to the internal antenna.

The shielding is done by the lower case shell (1050) which is covered with a conductive material, so no additional shielding screen is necessary.
The antenna (1130) is directly screwed into the lower case shell.

The keypad (1030), the loudspeaker (1120), the microphone (1110), the dust protection frame (1075) and the display window (1070) are mounted into the upper case shell (1040). Make sure that the microphone contacts are properly bent up when mounting.

When turning in the screws (1140, 1145 and 1150) make sure that the right torque is used (25 Ncm), because this will have an effect on the contacts of the interconnector.

4.1 S6 Power mechanical drawing



Note: The numbers shown above are NO ordering numbers. Please use the numbers supplied by your service manager for ordering!

4.2 Disassembling the S6 Power

1. Remove battery and SIM-Card.

2. Unscrew antenna (1130).

3. Unscrew 2 oval head screws (1160) (Torx 1,8x12).

4. Turn out 2 short screws (1140) (Torx 1,8x8).

5. Remove plastic disks (1170) and turn out the 3 long flat head screws (1150) (Torx 1,8x12).

6. Lift off the lower case shell (1050).

7. Lift composite of MMI-board (1020) and RF-and controle module (1010) out of the upper case shell (1040).

   Only for level-2 repairs:

   a) Remove ringer gasket (1080) from the MMI board (1020).
   b) Remove RF plug from RF- and control module (1010).
   c) Take off the MMI board (1020).
   d) Take frame (1060) off the RF- and control module (1010).
   e) Remove interconnector (1090) from the frame (1060).

8. If necessary: Take battery connector out of lower case shell (1050).

9. Take dust protection frame (1075) off the display glass frame (1070).

10. Take keypad (1030) out of upper case shell (1040).

11. Remove earphone capsule (1120) and microphone (1110) from upper case shell.

4.3 Assembling the S6 Power

1. Put earphone capsule (1120) and microphone (1110) into upper case shell (1040).

2. Insert keypad (1030) into upper case shell (1040).

3. Place dust protection frame (1075) on display glass frame (1070).
   Attention: The smooth side has to face the MMI.

4. If necessary: Insert battery connector into lower case shell (1050).

5. Insert composite of MMI-board (1020) and RF-and controle module (1010) into upper case shell (1040).

   BEFORE (only for level 2 repairs):

   a) Put interconnector (1090) to the frame (1060).
   b) Position frame (1060) on the RF- and control module (1010).
   c) Place MMI board (1020) on top of frame (1060).
   d) Connect RF plug of MMI board (1020) to RF- and control module (1010).
   e) Mount ringer gasket (1080) on the MMI board (1020).

6. Close device with upper case shell (1040). Make sure that the 6 hooks of the upper case shell fit firmly into the respective slots of the lower case shell (1050).

7. Screw 3 long flat head screws (1150) (Torx 1,8x12 /Torque 25 Ncm) into lower case shell (1050). Close holes with plastic disks (1170) afterwards.

8. Screw 2 short flat head screws (1140) (Torx 1,8x8 /Torque 25 Ncm) into lower case shell.

9. Screw 2 oval head screws (1160) (Torx 1,8x12 /Torque 25 Ncm) into lower case shell.

10. Screw in Antenna (1130) (Torque 25 Ncm).

11. Insert SIM-Card and battery.

4.4 Handset Datecodes

Siemens is using the industrial standard DIN EN 60062 to indicate the production / service dates. The code is printed on the IMEI sticker located under the simcard reader.

-> YY = Datecode

The first character of the datecode indicates the year of production:

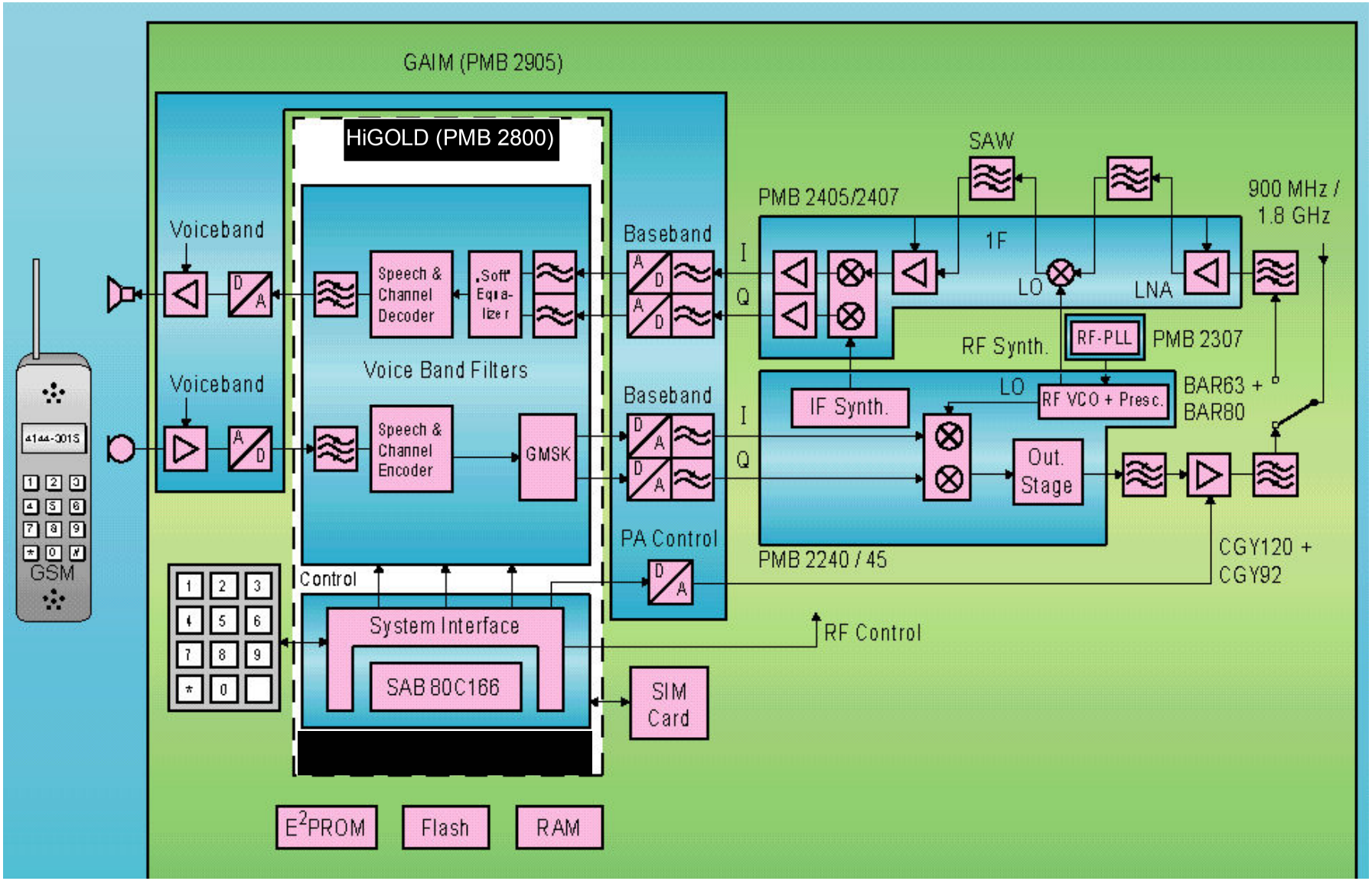
F = 1995
H = 1996
J = 1997
K = 1998
The second character indicates the month of production:

1-9 = january to september
O = october
N = november
D = december

Example: K1 means that the set was produced in january of 1998.

5 Hardware Concept

5.1 Block Diagram


GAIM (PMB 2905)
HiGOLD (PMB 2800)
Voiceband
Voiceband
Speech & Channel Decoder
„Soft" Equa-lizer
Voice Band Filters
Speech & Channel Encoder
GMSK
Baseband
Baseband
I
Q
I
Q
PA Control
Control
System Interface
SAB 80C166
SIM Card
RF Control
E²PROM
Flash
RAM
GSM
SAW
PMB 2405/2407
1F
LO
LNA
900 MHz / 1.8 GHz
RF Synth.
RF-PLL
PMB 2307
LO
IF Synth.
RF VCO + Presc.
BAR63 + BAR80
Out. Stage
PMB 2240 / 45
CGY120 + CGY92

5.2 Hardware Description

The handset consists of five major integrated circuits:

1) HiGOLD (PMB 2800)

This IC is a combination of microprocessor and signalprocessor.

The microprocessor is responsible for controlling the keyboard, SIM-Card, EEPROM, Flash and RAM.
Furthermore it controls the power up/power down of the RF module and sets the amplification of the PA.

The signal processor is responsible for processing the Rx I/Q signals (filtering, equalizing, speech and channel decoding).
Furthermore it does the speech and channel encoding and the GSMK modulation of the Tx I/Q signals.

3) GAIM (PMB 2905)

The GAIM provides the interface between the analogue signals (I/Q, voiceband, PA-control) and its digital representation.

4) Receiver Circuit (PMB 2405/07)

This circuit provides the following main functionalities:

a) Low Noise Amplifier (LNA) with a fixed amplification of +20dB to amplify the input RF signal.

b) Mixer to mix down the RF signal to the Intermediate Frequency (IF)

c) Programmable IF amplifier with a dynamic range of 60dB (-10dB ... +50dB in steps of 2dB)

d) Mixer to mix down the IF signal to the baseband, generating and inphase (I) and a quadrature (Q) signal.

e) Offset compensation for the I/Q signals.

5) Transmitter Circuit PMB 2240/45

This circuit provides the IF synthesizer, the I/Q modulator, prescalers to regulate the RF synthesizer and a buffer stage to feed the PA.

The antenna switch is electrical, controlled by a signal at the bottom connector.

5.3 Power Supply Concept

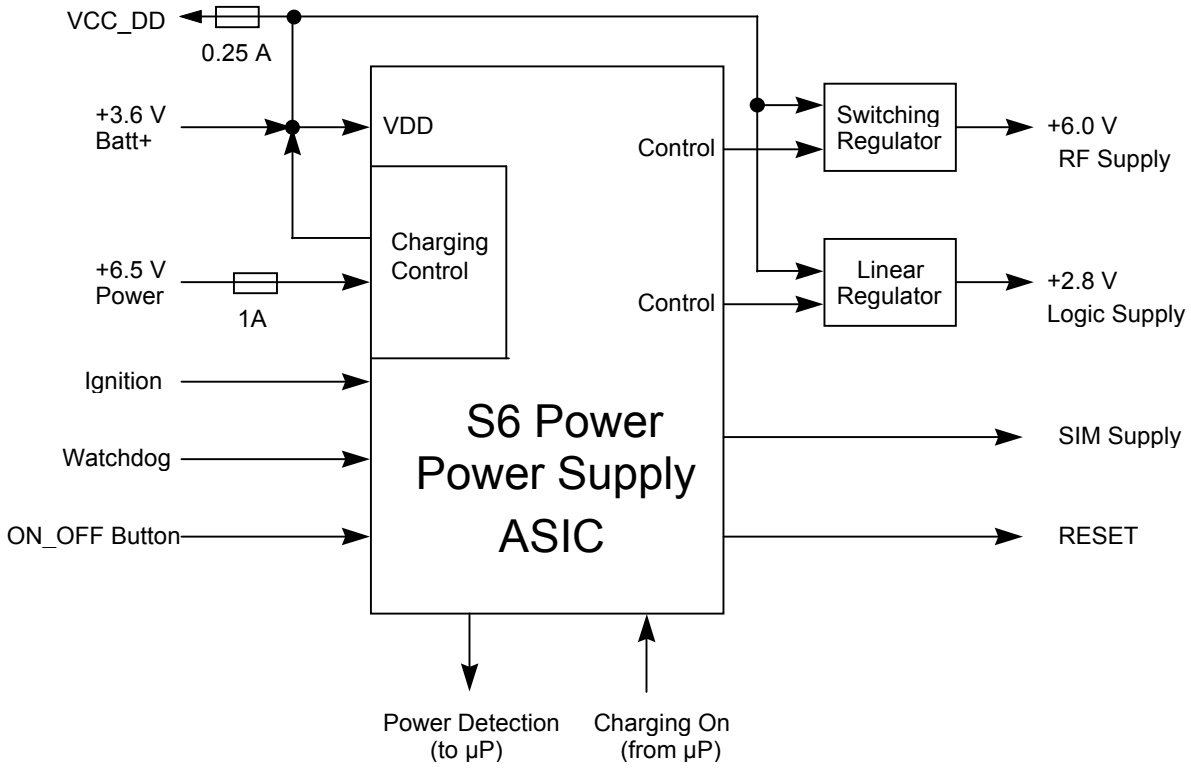
The S6 Power has two main power inputs (see Blockdiagram):

1) Battery Voltage (3.6 Volts) connected at the battery contacts

2) Charging Voltage (6.5 Volts) delivered by
   a) The plug-in charger at the charging plug
   b) The desktop charger using the charging contacts at the bottom of the phone
   c) The car kit using the charging connection at the bottom connector

Since the battery voltage is supplying the power supply asic, it is always needed to operate the phone. You cannot switch on the handset if the battery voltage is not present.

Blockdiagram Power Supply



From the 3.6 V battery voltage, all other supply voltages of the S6 power are derived, controlled by the power supply ASIC.
The VCC_DD voltage is used to supply external accessories through the bottom connector.

The RF module needs 6.0 V for its PA, this voltage is generated by a step-up converter.
The logic module uses 2.8 V, generated by a simple linear regulator.

Furthermore the ASIC generates the supply voltage for the SIM-Card and the RESET signal for the logic devices.

The ASIC also checks the presence of the watchdog signal from the µP and provides the switching on functionality (ON_OFF button or Ignition signal).

During testing ist is advisable to use a battery dummy, connected to a power supply delivering +4V, max 3A.
Make sure that you connect the battery dummy with the right polarity, the red plug to +4V and the blue plug to ground.

If you use a voltage higher than +7V, or with wrong polarity, the phone can be destroyed!

5.4 Overvoltage Conditions

a) Battery Voltage: If the battery voltages rises above 6.2 Volts, the phone will switch off and it cannot be switched on again before the voltage is lower than 6.2 Volts.

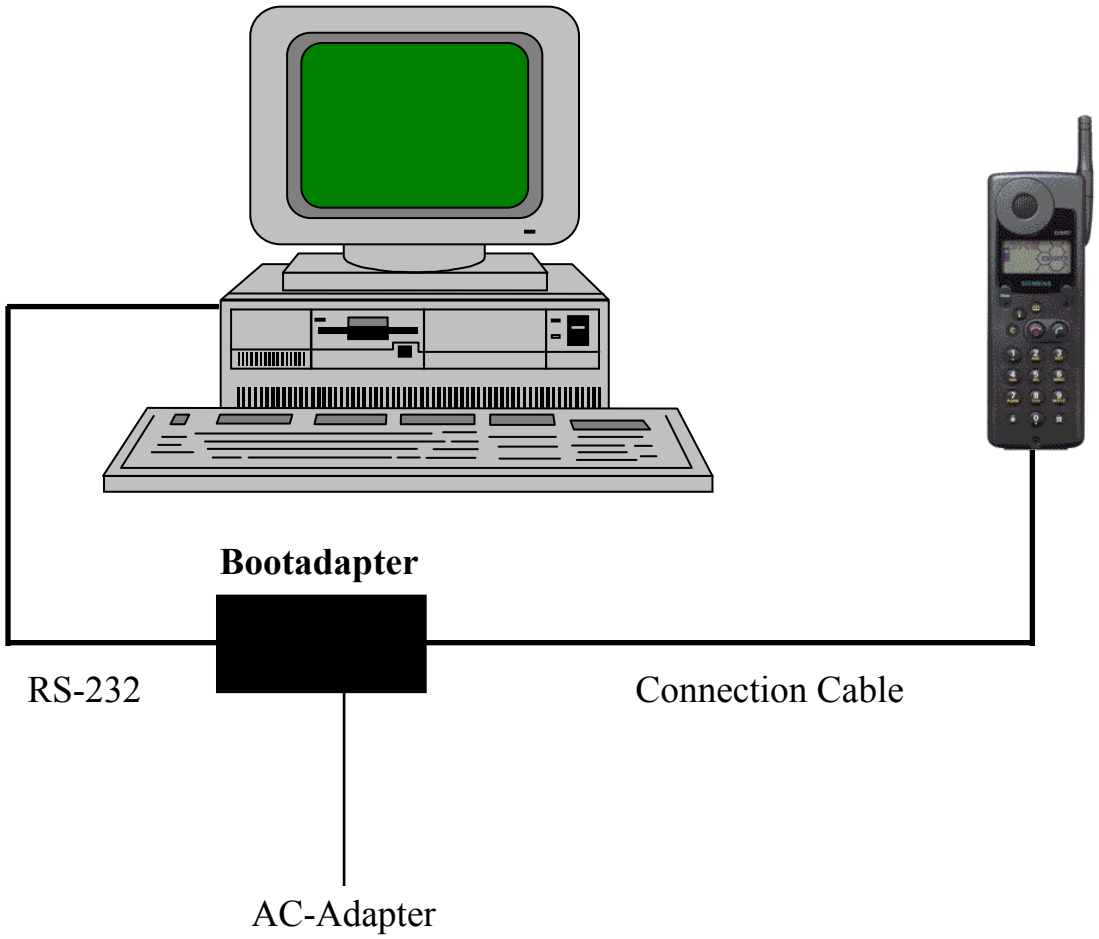
If the battery voltage rises above 7 Volts the phone can be destroyed.

b) Charging Current: The charging current must not rise above 1 A or the phone (fuse) will be inoperable.

-> Be careful with foreign accessories or chargers!
-> Make sure that the charging current is limited to a value below 1A!

6 Software programming

The software of the S6 Power handsets is programmed directly from a PC using the bootadapter (see drawing below).



6.1 Description of software booting

Connect COM-port of PC with bootadapter using the enclosed RS232 cable.
Afterwards plug in AC-Adapter, if connected correctly the „Power“ lamp will be active.

Switch off handset and connect it to the bootadapter with the connection cable.

Copy bootsoftware to your PC and follow the instructions in the „readme.txt“.

Ordering Number Bootadapter: L24857-F1006-A30
The bootadapter comes complete with AC-Adapter, RS-232 and handset connection cable.

6.2 Language Groups

There are different language groups of the same software version:

Attention: This information is subject to change! Contact your service coordinator for the latest update and ordering numbers.

Language Group	Display Languages
1	English/German/French/Italian/Portuguese/Spanish/Catalan/Turkish/Danish/Finnish/Swedish/Norwegian/Russian/Greek/Hungarian/Arabic/Dutch/Czek/Polish/Bulgarian/Chinese
2	Not yet defined

Remark: Since the S6 Power GSM has a big memory, a lot of languages fit into one handset software. That's why there is only one language group at the moment. More may be defined later.

7 Deblocking

If the phone is disabled due to a wrong entry of the phonecode (not PIN1, PIN2, network code or service provider code!) it can only be reset by entering the right unblocking code.

The unblocking code is derived from the IMEI number and can only be calculated by our hotline personell in Germany.

If you need unblocking codes just send a fax with the IMEI numbers to:

Siemens AG
PN KE SH
World Service Center
Bocholt, Germany

Fax: +49 2871 91 3007

Please use the appropriate form provided by your service coordinator!

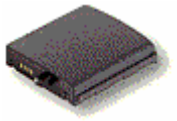
As an alternative, from november of 1997 on, an internet solution is offered.
This will be a password protected internet homepage where you can enter the IMEI number of the affected handset. The page will then present Master Phone Codes, Master Network Codes and Master Service Provider Codes if applicable.

Contact your service manager for details.

8 Battery

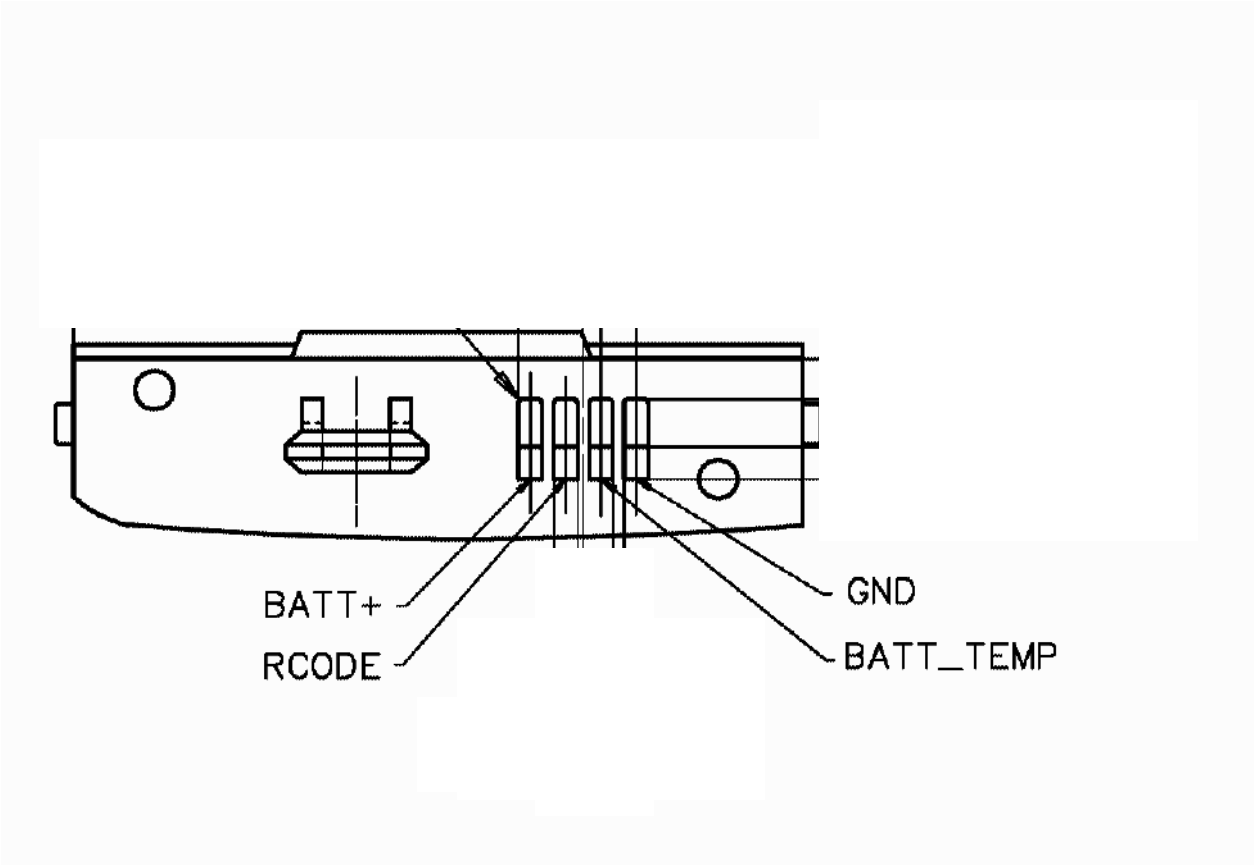
8.1 Specification

The standard S6 Power battery is a NiMH (Nickle Metal Hydride) type with a voltage of 3.6 Volts and a capacity of 700 mAh.



As an accessory, also an extended NiMH with 1500 mAh is available.

The Li-Ion battery of the S6 GSM/PCN with a capacity of 1000 mAh can be used.



The connections BATT+ and GND are used to supply the mobile, while RCODE is used to detect the battery technology. BATT_TEMP is used to measure the battery temperature.

8.2 Short Circuit Protection

The battery is short-circuit protected by an electronic fuse.
The resetting of the fuse can be done by the following procedures:

* Plug the battery into the desktop charger.

or

* Apply +5 Volts between the BATT+ and GND contacts (see drawing!)
  Limit the current to 10mA.

8.3 Deep Discharge

If the battery is deeply discharged it can be recharged by the following procedure:

Insert flat battery into handset and connect travel charger. The charging symbol will not be visible. Wait for appr. 1 hour and disconnect charger afterwards.

Remove battery and reinsert it. If you connect the travel charger now, the charging symbol must be visible on the handset display.